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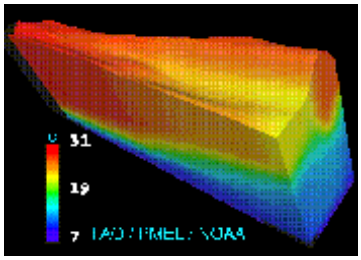
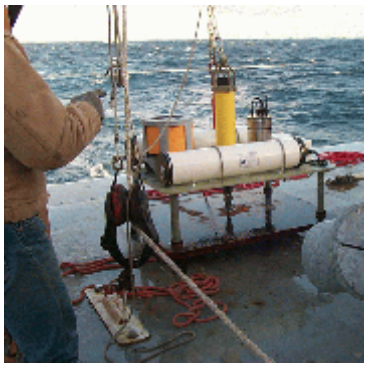
# Pacific Marine Environmental Laboratory

## *A leader in developing ocean observational systems to address NOAA's mission*

Moored buoy that measures ocean changes and transmits data in real time to forecast El Niños




Display of temperature and dynamic height from 70 buoy El Niño monitoring array



Tsunami detection instrumentation

### What does the Pacific Marine Environmental Laboratory do for the nation?

The Pacific Marine Environmental Laboratory (PMEL) carries out interdisciplinary scientific investigations in oceanography and atmospheric science. Current PMEL programs focus on open ocean observations in support of long-term monitoring and prediction of the ocean environment on time scales from hours to decades. Studies are conducted to improve our understanding of the complex physical and geochemical processes operating in the world oceans, to define the forcing functions and the processes driving ocean circulation and the global climate system, and to improve environmental forecasting capabilities and other supporting services for marine commerce and fisheries. Results from PMEL research activities contribute to NOAA's strategic goals of implementing seasonal-to-interannual climate forecasts, assessing and predicting decadal to centennial climate change, advancing short-term warning and forecast services, and building sustainable fisheries.

### Recent Accomplishments:

- Observations of oceanic and atmospheric conditions in the tropical Pacific are essential for the prediction of El Niño and La Niña events. To provide these data, PMEL completed the Pacific Tropical Atmosphere Ocean (TAO) Array, the world's largest number of instrumented buoys comprising a single ocean climate observing system. ***Payoffs: Data from the TAO Array was critical in the prediction of the 1997 El Niño six months in advance*.**

- PMEL pioneered the development of a deep-ocean real-time tsunami (huge sea wave) monitoring network and the methodology for producing tsunami inundation maps to assist coastal communities in development and emergency management planning. PMEL currently leads the National Tsunami Hazard Mitigation Program. ***Payoffs: Tsunami evacuation maps are now available in the five west coast states and the real-time deep ocean detectors are providing more accurate forecasts of warnings to reduce false alarms.***

- PMEL studies the impact of underwater volcanoes on the ocean's heat content and chemistry. This research has led to the first ever real-time detection of an underwater volcanic eruption and the discovery of new microbial life forms that are ejected from deep within the volcano. ***Payoffs: Several new microbial life forms have been incubated that have valuable biological properties, relevant to the biotechnology industry.***

1315 East West Hwy
Silver Spring, MD 20910
301-713-1671
www.oar.noaa.gov

- PMEL, along with the National Marine Fisheries Service (NMFS) studies the complex interactions between commercially important fish species and their environment. ***Payoffs: This understanding, along with monitoring the environment throughout the life cycle of the fish, will assist decision-makers and improve forecasts of the abundance of these species. Forecasts of pollock abundance in Alaska have improved over the past six years.***

## What's next for PMEL?

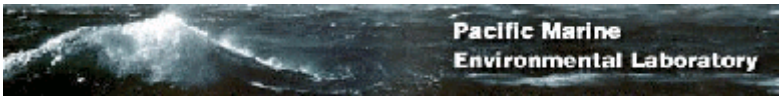
PMEL conducts complex oceanographic experiments. Laboratory strength lies in the experience and knowledge of its scientific and engineering staff and their ability to obtain, process, analyze , and distribute high-quality oceanographic measurements. This capability requires a modern, well-maintained infrastucture of scientific instruments, computing and networking resources, oceanographic research ships, and a continuous engineering development capability. For the future, PMEL needs to maintain and enhance its proven observational and analysis capabilities and increase emphasis on numerical modeling techniques, information technology, and engineering as tools to aid in observing system design, experiment planning, implementation, data interpretation, and dissemination. PMEL will continue to conduct research that improves the services and products that NOAA's line offices offer to the general public.

## Research Partnerships:

PMEL has partnerships with the Cooperative Institute for Arctic Research (University of Alaska); the Cooperative Institute for Marine Resources Studies (Oregon State University); the Joint Institute for Marine and Atmospheric Research (University of Hawaii); and the Joint Institute for the Study of the Atmosphere and Ocean (University of Washington) and the office of emergency services for Alaska, California, Hawaii, Oregon, and Washington. Federal partners include, the National Science Foundation, the U.S. Geological Survey, the Federal Emergency Management Agency, the Office of Naval Research and other NOAA line offices.

## Budget and Staff:

PMEL is a $14.4 million laboratory ($6.7 million in NOAA base), with a staff of 176, including 99 federal employees, 17 contract employees and 60 university employees.




**For more information, contact:**
Dr. Eddie N. Bernard, Director
7600 Sand Point Way, NE, Building 3
Seattle, WA 98115-6349
Phone: (206) 526-6810
http://www.pmel.noaa.gov